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Revision -

Lunar Reconnaissance Orbiter Project

Solar Array
Deliverable Items List and Schedule

December 19, 2005

LRO GSFC CMO

January 17, 2006

RELEASED

National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

CM FOREWORD

This document is a Lunar Reconnaissance Orbiter (LRO) Project Configuration Management (CM)-controlled document. Changes to this document require prior approval of the applicable Configuration Control Board (CCB) Chairperson or designee. Proposed changes shall be submitted to the LRO CM Office (CMO), along with supportive material justifying the proposed change. Changes to this document will be made by complete revision.

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LUNAR RECONNAISSANCE ORBITER PROJECT

DOCUMENT CHANGE RECORD

REV LEVEL	DESCRIPTION OF CHANGE	APPROVED BY	DATE APPROVED
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1.0 INTRODUCTION

This document is the Deliverable Items List and Schedule (DILS) for the LRO Solar Array (SA). This document provides specific information on the hardware and data deliverables for the SA.

1.1 PROPRIETARY DATA

Some of the content of documents may be of a proprietary nature to the document preparing/ sending party. In the event data is deemed to be proprietary, the sending Party shall mark the document with a notice to indicate that the data therein is proprietary and shall be used and disclosed by the receiving Party and its related entities (e.g., contractors and subcontractors) only for the purpose of fulfilling the receiving Party's responsibilities under the Lunar Reconnaissance Orbiter (LRO) Project, and that the identified and marked technical data shall not be disclosed or retransferred to another Party without prior written permission of the document preparer.

1.2 APPLICABLE DOCUMENTS

431-SOW-000038	Solar Array Statement of Work
431-SPEC-000037	Solar Array Specification

2.0 DELIVERABLE DOCUMENTATION

This section provides a tabular listing of documentation deliverables, including the following information:

Description: This provides the title of the deliverable item.

Reference: This provides the reference back to the pertinent document calling out the deliverable.

Category:

A = Approval: Documents in this category require approval from the National Aeronautics and Space Administration (NASA)/Goddard Space Flight Center (GSFC) Contracting Officer (CO). In general, documents shall be provided in contractor format as long as required content, as specified in the Lunar Reconnaissance Orbiter Solar Array Statement of Work (431-SOW-000038) is addressed.

R = Review: Documents in this category do not require formal NASA/GSFC CO approval. They must be received within a specified time period and are subject to evaluation. The NASA/GSFC CO reserves the time-limited right of disapproval for each submission. The time-limited period is two weeks from receipt of documents.

I = Information: Documents in this category are informal and are for information only.

Quantity: This provides the required number of copies for the deliverable. All data is required to be submitted electronically. The number in the quantity column refers to the number of hard copies required.

Delivery Date: This provides the fixed or relative date or time that the deliverable is required.

2.1 HARDWARE DELIVERABLES AND SCHEDULE

Item	Description	Quantity	SOW Reference	Due Date (ADC)
1	Test Panel	5	3.1	24 Weeks
2	Shipping Containers for Test Panels	1 or more as required	5.0	24 Weeks
3	Blocking Diodes for Test	12	3.7	24 Weeks
4	Qualification Panel	1	3.1	78 Weeks
5	Shipping Containers for Qualification Panel	1	5.0	78 Weeks
6	Test Panel Assembly	1	3.1	78 Weeks
7	Shipping Container for Test Panel Assembly	1	5.0	78 Weeks
8	Flight Panel	85	3.1	78 Weeks
9	Shipping Containers for Flight Panel	1 or more as required	5.0	78 Weeks
9	Isc and Voc Sensor Panel	1	3.2	78 Weeks
10	Shipping Container for Isc and Voc Sensor Panel	1	5.0	78 Weeks
11	Standard Full Cell	1	3.4.1	78 Weeks
12	Standard Top Cell	1	3.4.1	78 Weeks
13	Standard Middle Cell	1	3.4.1	78 Weeks
14	Standard Bottom Cell	1	3.4.1	78 Weeks
15	Spare Solar Cells	50	3.5	78 Weeks
16	Spare Covers	50	3.5	78 Weeks
17	Spare Interconnects	50 of each type	3.5	78 Weeks
18	Spare CICs	100	3.5	78 Weeks
19	Spare Terminal Boards	10	3.5	78 Weeks
20	Spare Wire	10 meters of each type	3.5	78 Weeks
21	Spare Blocking Diodes	10	3.5	78 Weeks
22	Shipping Containers for Spare Parts	1 or more as required	5.0	78 Weeks
23	Hot Temperature Test Apparatus	1	3.6	78 Weeks
24	Shipping Container for Hot Temperature Test Apparatus	1 or more as required	5.0	78 Weeks

2.2 DATA DELIVERY DOCUMENTATION AND SCHEDULE

Item	Title	S.O.W Ref.	Category	No of Copies	Frequency of Delivery	Due Date
1	Quality Assurance Plan/Manual	4.1.1	A	5	One Time	10 days Prior to DCR
2	DCR Presentation Package	2..3.1.1	I	5	One Time	10 days Prior to DCR
3	DCR Flight Panel Output Predictions	2.3.1.2	R	5	One Time	10 days Prior to DCR
4	Typical Cell I-V Curves	2.3.1.3	R	5	One Time	10 days Prior to DCR
5	Cell Degradation as a Function of 1-MeV Electrons	2.3.1.4	R	5	One Time	10 days Prior to DCR
6	Solar Cell Radiation Damage Coefficients	2.3.1.5	R	5	One Time	10 days Prior to DCR
7	DCR Mass Estimate	2.3.1.6	R	5	As Updated	10 days Prior to DCR
8	DCR Drawing Package	2.3.1.7	R	5	One Time	10 days Prior to DCR
9	Verification Matrix	2.3.1.8	A	5	One Time	10 days Prior to DCR
10	Preliminary Flight Panel Test Plan	2.3.1.9	A	5	One Time	10 days Prior to DCR
11	Qualification and Test Panel Assembly Test Plan	2.3.1.10	A	5	One Time	10 days Prior to DCR
12	Qualification and Test Panel Assembly Test Procedure	2.3.1.11	A	5	One Time	10 days Prior to DCR
13	Program Schedule	2.3.1.12	A	5	One Time	10 days Prior to DCR
14	Failure Modes and Effects Analysis	4.3.1	R	5	One Time	10 days Prior to DCR
15	EEE Parts Stress Analysis	4.3.2	R	5	One Time	10 days Prior to DCR
16	Worst-Case Analyses	4.3.3	R	5	One Time	10 days Prior to DCR
17	Reliability Prediction	4.3.4	R	5	One Time	10 days Prior to DCR
18	Parts, Materials and Processes List on GSFC 18-59	4.7, 4.8	A	5	One Time	10 days Prior to DCR
19	DCR Report	2.3.1.13	R	5	One Time	7 days after DCR
20	MRR Presentation Package	2.3.2.1	I	5	One Time	10 Days Prior to MRR
21	MRR Flight Panel Output Predictions	2.3.2.2	R	5	One Time	10 Days Prior to MRR

Item	Title	S.O.W Ref.	Category	No of Copies	Frequency of Delivery	Due Date
22	MRR Mass Estimate	2.3.2.3	R	5	One Time	10 Days Prior to MRR
23	Qualification Panel Report	2.3.2.4	R	5	One Time	10 Days Prior to MRR
24	Flight Panel Test Plan	2.3.2.5	A	5	One Time	10 Days Prior to MRR
25	Flight Panel Test Procedure	2.3.2.6	A	5	One Time	10 days Prior to MRR
26	Procedures for handling, cleaning, storage, preservation, labeling, packaging, packing, and shipping of deliverables	4.6.3	A	5	One Time	10 days Prior to MRR
27	MRR Report	2.3.2.7	R	5	One Time	7 days after MRR
28	PSR Presentation Package	2.3.3.1	I	5	One Time	10 Days Prior to PSR
29	Final Panel Output Estimate	2.3.3.2	R	5	One Time	10 Days Prior to PSR
30	Report on Final Mass Measurement	2.3.2.3	R	5	One Time	10 Days Prior to PSR
31	Final Drawing Package	2.3.2.4	A	1	One Time	10 Days Prior to PSR
32	Final Verification Matrix	2.3.2.5	A	5	One Time	10 Days Prior to PSR
33	Acceptance Data Package	2.3.2.6	A	5	One Time	With Delivery of the Flight Panels
34	Monthly Status Report	2.5	I	5	Monthly	The 10th of the Following Calendar Month
35	Class I Engineering Changes	4.1.3	A	5	As Required	Within 7 Days of the Change
36	Class II Engineering Changes	4.1.3	R	5	As Required	Within 7 Days of the Change
37	Anomaly Report	4.1.4	A	5	As Required	Verbally Within 24 hours, In Writing, Within 7 Days of Generation
38	Part Notification of Failure, Failure Reporting Data	4.7.7	I	1	As Required	Within 72 Hours of Part Failure Determination
39	Waivers and Deviations on DD1694	2.3.3	A	5	As Required	Within 7 Days of the Generation

2.3 GOVERNMENT-FURNISHED EQUIPMENT AND SCHEDULE

S.O.W. Reference: 3.3

Item	Description	Quantity	Due Date (ADC)
1	Substrate for Qualification Panel	1	12 Weeks
2	Substrate for Test Panels	5	12 Weeks
3	Test Panel Assembly	1	28 Weeks
4	Substrate for Flight Panel	85	36 Weeks
5	Substrate for Isc and Voc Sensor Panel	1	36 Weeks

Appendix A. Abbreviations and Acronyms

ABBREVIATION/ ACRONYM	DEFINITION
A	Approve
ADC	After Date of Contract
CCB	Configuration Control Board
CCR	Configuration Change Request
CM	Configuration Management
CMO	Configuration Management Office
CO	Contracting Officer
CIC	Covered Interconnected Cell
DCR	Design Conformance Review
DILS	Deliverable Items List and Schedule
EEE	Electrical, Electronic, and Electromechanical
GSFC	Goddard Space Flight Center
I	Information
Isc	Short-Circuit Current
LRO	Lunar Reconnaissance Orbiter
MeV	Mega-Electron Volts
MRR	Manufacturing Readiness Review
NASA	National Aeronautics and Space Administration
PSR	Pre-Ship Review
R	Review
SA	Solar Array
SOW	Statement of Work
SPEC	Specification
Voc	Open-Circuit Voltage